RESEARCH PROPOSAL

ROLE OF GEOGRAPHICAL FACTORS ON CRIME IN RAJASTHAN- A CASE STUDY OF KARAULI AND DHOLPUR DISTRICTS

For Registration to the Degree of

Doctor of Philosophy

IN THE FACULTY OF SCIENCE

IIS (DEEMED TO BE UNIVERSITY), JAIPUR

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IISU/ADM/2019/ 26855

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June, 2020

INTRODUCTION

From the last few decades, crime has been a subject of keen interest in various multidimensional sciences and has also garnered interest amongst common masses. Debates have been going on in almost every household regarding the increasing crime rate, the changing attitude of liberal judges to crime and criminals and even the criminals choosing politics as a suitable way out.

The earliest origin of the world Crime has its origin in the Latin and Greek words “cemo” and “krima” respectively roughly meaning “I decide I give judgment”. Or “I decide, I shift.”

DEFINITIONS

The legal definition of crime is that it is behaviour or an activity in violation of the legal code. Paul Tappan (1960) defines crime as “an intentional act or omission in violation of criminal law committed without defence or justification and sanctioned by the state for punishment as a felony or a misdemeanour”

Indian Penal Code (IPC) has used the word “offence” instead of crime within Section 40 of IPC has defined it as an act which is punishable under the law.

CLASSIFICATION OF CRIMES

There have been various bases that have been used by propounders to classify crime such as atrocity, seriousness of crime, motives which can be economic, sexual, political and miscellaneous (with vengeance as chief driving force).

Crimes are also classified for statistical purposes into four groups:

1. Against Person (Assault, murder)
2. Against Property (Theft, Robbery)
3. Against Public Decency (Drunkenness, disorderly conduct)
4. Against Public Justice (Embezzlement, Breach of Trust)

Lemert(2000) has classified crimes as situational or systematic whereas Clinard and Quinney gave six classifications: Violent personal crime, Occasional Property crime, Occupational crime, Political crime, Public Order Crime and Conventional crime. (Ahuja, 2000).

In India, the Indian Penal Court identifies crime in an exhaustive detail and specifications. A broader classification has been mentioned in the following table:

Broad Classification of Crimes under Indian Penal Code	
Crimes Against Body	Murder, Culpable Homicide not amounting to Murder, Kidnapping & Abduction, Assault, etc.
Crimes Against Property	Dacoity, Robbery, Burglary, Theft
Crimes against Public Order	Riots, Arson
Economic Crimes	Cheating, Counterfeiting
Crimes against Women	Rape, Dowry Death, Cruelty by Husband and Relatives, Molestation, Sexual Harassment and Human Trafficking
Crimes against Children	Child Rape, Kidnapping & Abduction of Children, Selling/ Buying of Girls for Prostitution, Abetment to Suicide, Infanticide, Foeticide, Etc
Other IPC Crimes	

Table: Prepared by Researcher

FACTORS INFLUENCING CRIME

Crime and criminology has always been subjective in nature and can never to account to any particular trigger. Thus, this gives a multi dimensional aspect to the causal factors. These factors, however big or small, affect the whole of the entire society at a larger perspective. These factors are also called ordinary factors which have a primary characteristic and are further divided into four secondary factors.

- Geographical
- Sociological
- Physiological
- Circumstantial

a) Geographical Factors:

In the evolution of society the geographical elements play an important role. This has been accepted by historian's torsions and sociologists. A supporter of the school of geographical thinker's tradition, Huntington (1924) states that a child born in winter usually becomes less intelligent. Some of such children become criminals. The geographical elements affect the

emotions and behaviour of an individual. Many of the French, Italian and German criminologists have tried to show the relation between the features of geographical elements and the proportion of crimes. Pelham (1841) also prepared a calendar showing the occurrence of crimes in specific months of the year. According to him, child murders are proportionally more in the period from January to April. In July, murders and total attacks are found to increase.

Human needs change according to the changes in seasons. For instance, in winter in the European countries, the primary (basic) needs increase and if there are obstacles in satisfying their needs, the individuals have a tendency to criminal acts. By geographical factors, we mean those factors which are connected with physical environment. The geographical setting governs the form of society. Due to geographical differences we find different types of culture and civilization in different geographical regions. The composition of population is closely connected with geographical conditions. Similarly diet, habits and social organization always develop in accordance to geographical conditions. Therefore whenever there is any change in the geographical setting there is also change in society.

b) Sociological Factors:

The number of crimes increases or decreases depending upon how far a society or a community is organized or divided. In a social group where migration, cultural differences, changes in the population and political instability prevail; there a conflict arises regarding the abatement of social rules.

c) Physiological Factors:

As a living being, man's physique, heredity and the functions of body glands are taken into consideration. A man of oppressive and bad tempered mentality becomes a criminal. Broadly speaking, an individual inherits some of the organic properties from the parent's also known as hereditary qualities. This inherited behavioural property is mainly responsible for the criminal attitude. Hereditary weakness and criminal attitude convert a man into a criminal. Some psychologists say that criminal behaviour has its roots in the psychological set up of an individual. During the gradual psychological development of an individual some mental weaknesses take shape. These weaknesses become the causes of criminal behaviour. Mental instability and criminality are closely related. Some psychiatrists have tried to correlate criminality with the abnormality in the nerves. Disappointment, conflict, feeling of

criminality, mental shocks etc. one related with the human mental activities and they become responsible for the criminal behaviour. Sociologists, Psychologists and Psychiatrists have deeply studied of human behaviour. These stimuli are created from eternal circumstances.

d) Circumstantial Elements:

These are related with the criminality of human beings. The following circumstantial elements may be considered.

- Family Circumstances
- A Ruined Family
- The Size of the Family
- Serial Placement among Brothers in a Family
- Discontentedness in the Family
- Fallen Family
- Absence of Orderliness in the Family
- There is a proverb that "A man is recognized by the company he keeps" thus companionship is another.
- Living in disorganized societal setup
- Disorganized living under congested conditions
- The Movies
- Financial Conditions
- Difference in social status due to monitory conditions
- Regional Variance
- Class, age, sex, race etc. Racial or national influence

Because of the subjective nature of Crime and criminology, there are always multiple factors influencing even a single occurrence of crime. Therefore, it is imperative to acknowledge all.

GEOGRAPHY AND CRIME

In the main four major schools have developed in the study of crime from geospatial perspective. These are namely, **Cartographic school** (Guerry, 1833; Quetelet, 1842), **Chicago school** in 1920s and 1930s (Shaw and McKey 1931), **Factor analytical school** of 1950s and 1960s, and the most recent

Environmental criminology and Geography of crime (Brantingham and Brantingham, 1995)**.** The first two perspectives were mainly leaned towards positivist school of criminology. Factor analytic school helped the resurgence of spatial perspective in crime study.

In the decade of 1980s, Geography of Crime has become a distinct discipline of geography with the emergence of environmental criminology. Though environmental criminology is a part of criminology but with the development of behavioural approach in the geography of crime; both the disciplines tend to merge with each other. Thus geography of crime simply defined as:

''The geography of crime is the study of the spatial manifestation of criminal acts. It is the study of the social and cultural organization of criminal behaviour from a spatial perspective. It is not the study of spatial organization and particularities of the judicial response of criminal behaviour.'' (Georges, 1978).

Georges has seriously incorporated the classical ecological concept in the field of geography of crime in identifying delinquency area. Here it is important to mention that geography of crime is different from the geography of justice which rather focuses on spatial variations of criminal justice process i.e., law enforcement and enactment of the laws by the administration, judges, juries, sentencing etc. Geographers are mainly concerned with the correlation between crime (crime statistics) and various social and environmental indicators.

By examining the link between geography and crime one can explore the root cause factors that influence crime and if they can be tackled at the ground zero, then it will prove beneficial rather that curbing them in future. Geographically studying crime should be an integral approach.

CRIME MAPPING

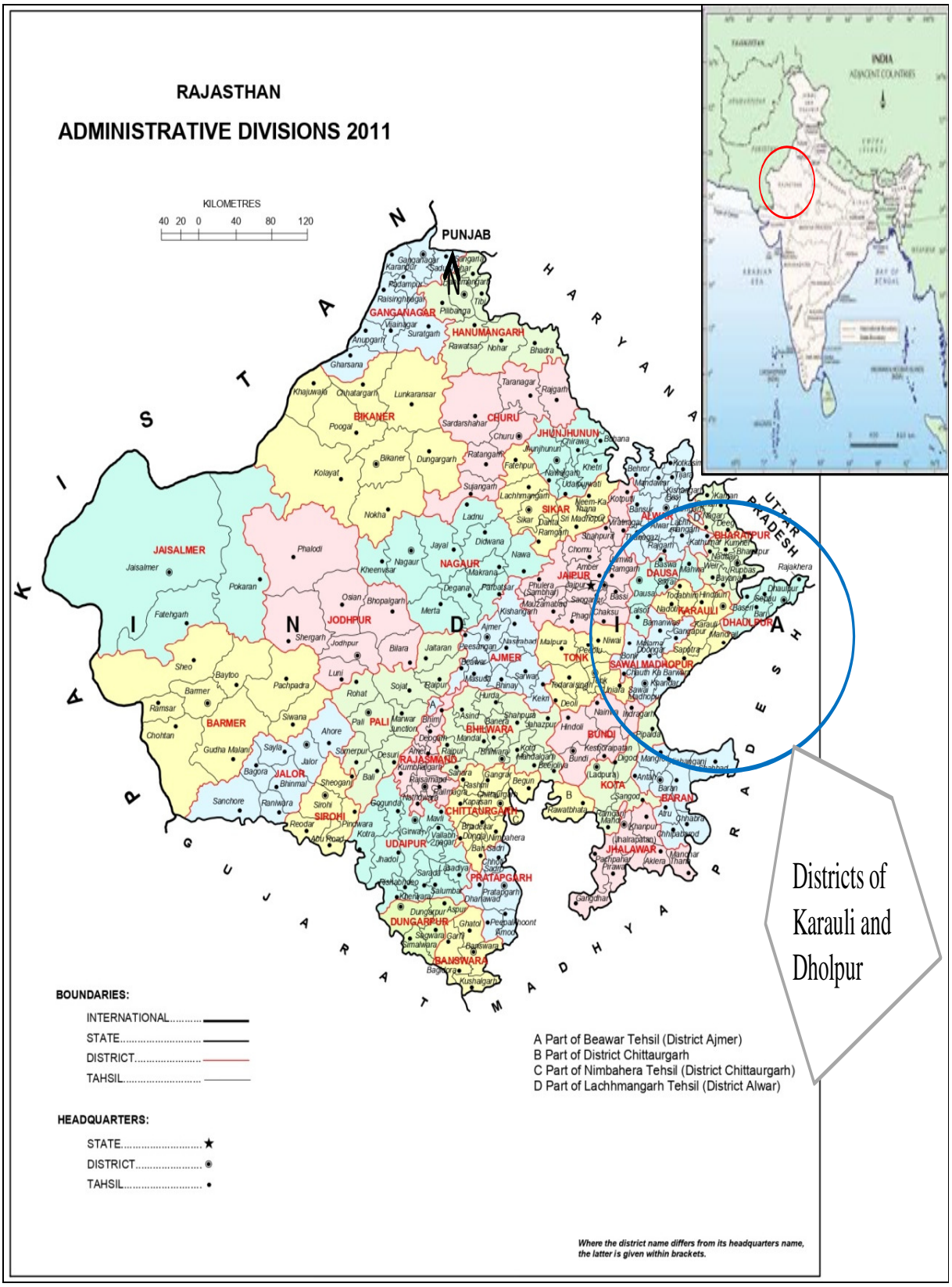
Crime mapping is the process of using a geographic information system to conduct spatial analysis of crime problems and other police-related issues. With the help of GIS and other cartographic techniques will help in better understanding of the vulnerable areas prone to occurrences of crime. A geographic information system translates physical elements in the real world— such as roads, buildings, lakes, and mountains—into forms that can be displayed, manipulated, and analyzed along with police information such as crime, arrest, and traffic accident data.(Santos, 2005)

Thus models like Risk Terrain Modeling and other geographic profiling methodologies can aid the representation of these parameters by integrating multiple layers.

STUDY AREA

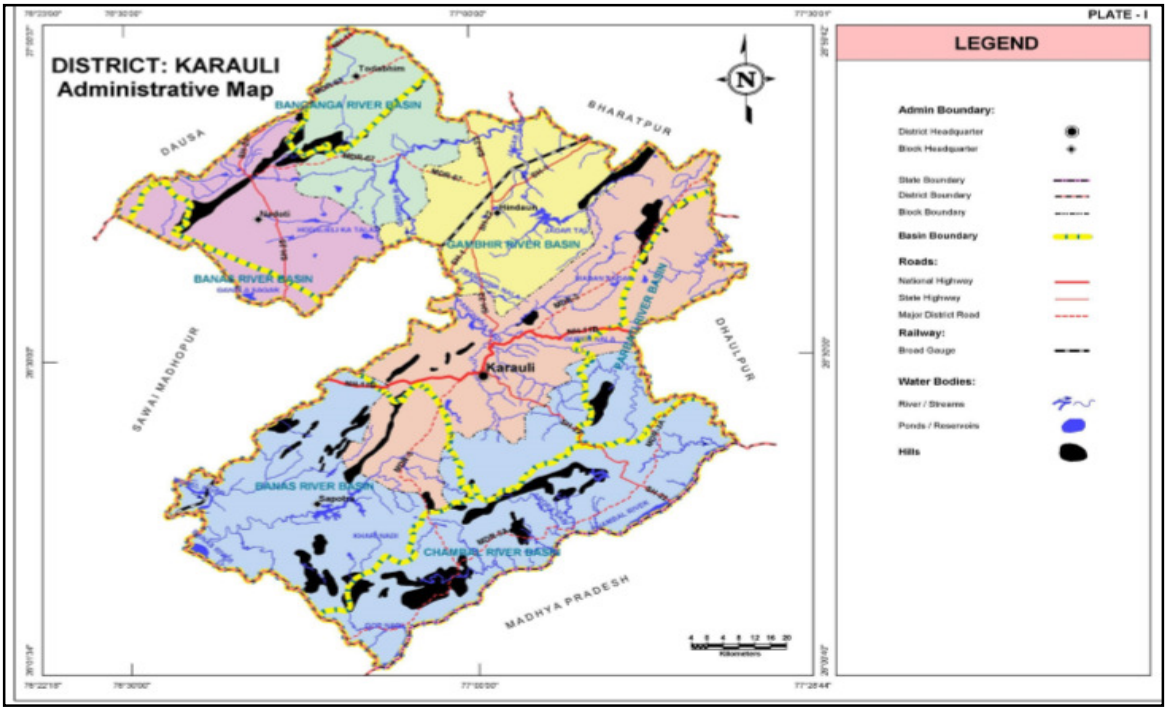
The desert state of Rajasthan is located 23˚ 3' to 30˚ 12' North latitude and 69˚ 30' to 78˚ 17' East longitude, with the Tropic of Cancer passing through the southernmost tip of the State. The State is situated in land-locked north-western part of the Indian union covering arid Great Indian Desert and parts of semi-arid climate zone. The State has an area of 132,140 square miles (342,239 square kilometres) which is around 10.45 per cent of India. The State has 33 administrative unites divided into 241 tehsils and 237 development blocks as of 2001 census of India. It is surrounded by Punjab in north, Gujarat in south, Pakistan in west and Uttar Pradesh in east. It has also borders with Haryana and Delhi in north-east and Madhya Pradesh in south east.

For the purpose of proposed research, Karauli and Dholpur districts of Rajasthan have been selected.



Source: http://censusindia.gov.in/2011census/maps/administrative_maps/RAJASTHAN.pdf

KARAULI



Source: Administrative Map, Hydro-geological Atlas of Karauli, 2017

Karauli district located in the eastern Rajasthan and lies between 26° 3' N to 26° 49'N latitudes and 76° 35'E to 77° 26'E longitudes. The mean sea level of the district is between 400 to 600 meters, and total area of district is 5070 sq kms. Dholpur lies on the East and Bharatpur district in the North-East, Dausa in North-West and on the South-West lies Sawai Madhopur. It shares inter- state boundary in the South-East direction with Madhya Pradesh. Chambal River separates the Karauli and Morena district of Madhya Pradesh. Administratively, the district comprises 6 tehsils namely Hindaun, Karauli, Mandrail, Nadauti, Sapotra and Todabhim.

It is famous for its geographical peculiarities and is full of natural beauty. It is surrounded by Vindhyachal and Aravalli Mountain ranges. The hills become more high and extensive in the Tehsil of Karauli. The Aravallis in the district are mostly found in the northern, western and southern parts, which comprises of Hindaun, Mandrail and Karauli sub-divisions. The south-west portion of the district has many low hills ranges. In Karauli Tehsil, the hills become relatively higher and more extensive thereby making the terrain, specifically the interior, hillier and in some places not easily approachable. Hills and broken ground are prevalent in almost the whole area, which lies within a tract and are locally termed as Dang.

In Karauli Tehsil, ravines intersect hills which consist chiefly of granite and sandstone, occasionally mixed with white and black marble and mica. They are said to be primitive rocks belonging to the transitionary series, as they do not contain any fossil remains. The principal hill ranges are in the north-eastern portion of the district where several ranges run along or parallel to the northern border, forming somewhat formidable barriers. The slopes of the hills are gentle and these are wooded. Along the valley of the Chambal River, irregular and lefty walls of rocks, separate the lands on the bank from the uplands, which the southern part of the district comprises.

Drainage System: - River Gambhir emerges from the hills in Nadauti Tehsil and flows through the upper Hindaun and lower Todabhim sub divisions and then flowing in the district for about 42km. It then passes to Bharatpur district and later River Churahao, after flowing through Todabhim Tehsil, joins it in Pali. River Morel is a tributary of Banas.lt rises in the hills near Dhuli in Jaipur district. It is joined by the river Dhund and onwards by Khari River.

The Khari River rises in Todabhim and lalsot ranges of hills, about 15km north of Bamanwas and after flowing south ultimately joins the Morel. The Banas: - It rises in the hills near Saimar in the Aravalli range, to the west of Udaipur and enters Karauli district south and for a short distance forms the boundary with Tonk district. In the hot months the riverbed is dry but it becomes treacherous after the rains. Chambal: - The River Chambal forms the border between this district and the state of M.P on the south-eastern portion it enters the district near village Karamapura its bed is sandy and rocky and the Morel and the Banas are its important tributaries in the district. The rivers and streams in the district are very helpful in increasing the supply of sub-soil water in 7 wells by percolation. There are no natural lakes in the district though tanks are numerous. The water from these tanks is used predominantly for irrigation purposes.

Soil:- The general texture of the soils in the district ranges from deep medium heavy and black greyish dark drown soils to deep yellowish brown soils.

Climate:-The climate of Karauli is mostly sunny throughout the year with temperatures ranging between high 35 °C and low 23 °C. The humidity of this region ranges from 31 to 35% with a dew point of 11° to 15°. The winds speed is NW 11–15 km/h. The chance of precipitation sways from 30% to 40%. During the rainy season the village gets scattered showers. This region is termed to be dry climate area of subtropical region. There is also distinct winter and long summer season. The highest recorded temperature is 49 °C during

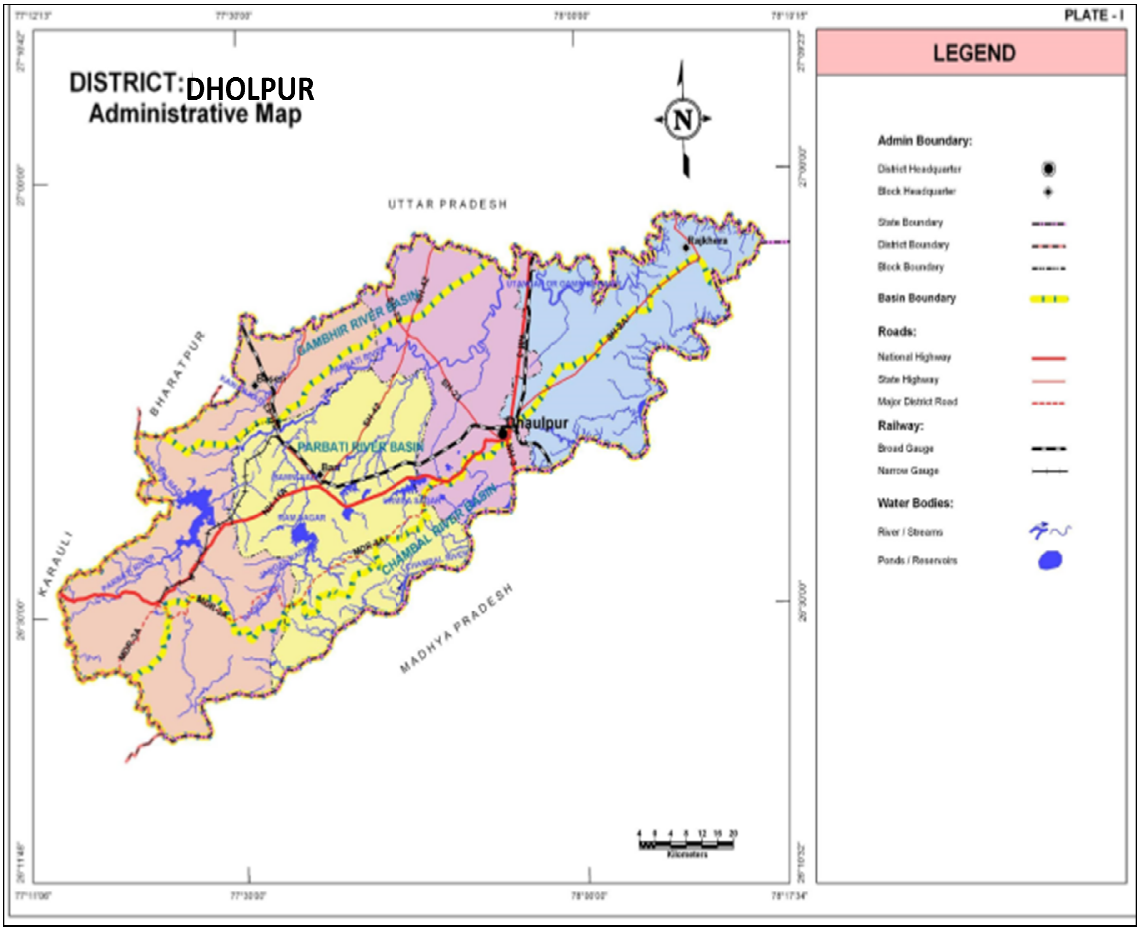
May–June and lowest temperature is 20 °C during January and the average rainfall recorded in this district is 880 mm. The monsoon season falls in July to September.

Flora and Fauna: - Trees form the main sources of small timber, firewood and charcoal and therefore, the most valuable and revenue yielding forests for this area. The principal specie found is Dhok along with some other species like Raunj, Tendu, Gurian, Khirni, Khoi, Jamun, Aam etc. Forests are degrading because of severe anthropological interference. Inferior species such as Darshan and Thor Scrub forests is confined to the ravines and minor sand dunes. The overall condition prevailing in these habitats is Xerophytic. The Forest Department in the district has raised plantations of a variety of species by trench and mound system. The species commonly found in these plantations are Shisham and Babul. The forests are a source of small timber firewood, charcoal, grass for grazing along with fencing and thatching material. Bamboo, tendu patta, gum, gughal gum, dhok leaves, honey, wax, medicinal herbs, flowers, katha, karanj and others account for minor forest produce. Karauli district is rich in wildlife. The area has been included in the Tiger Project and accounts for wide and evenly balanced fauna. Tiger, leopard or panther and wild dog (dhole) are found in this area. Ranthambore Sanctuary is distributed all over Karauli. Rhesus monkey is occasionally seen here along with large Chital population and Chinkara in small groups. The fish-owls and ring tailed fishing eagle is also seen along with crested serpent.

Economy: Agriculture is the primary activity of the area along with mining due to the presence of above mentioned minerals and building stones. In 2006 the Ministry of Panchayati Raj named Karauli one of the country's 250 most backward districts. It is one of the twelve districts in Rajasthan currently receiving funds from the Backward Regions Grant Fund Programme (BRGF).

Demography: According to Census 2011, Karauli had population of 1,458,248 of which male and female were 783,639 and 674,609 respectively. There was change of 20.55 percent in the population compared to population as per 2001. The Population density is 264 people per sq. Km. and the literacy rate is 66.22%.The Gender Ratio stood at 861 females per 1000 males. Only 14.96% population lives in the urban areas. Maximum population accounts for rural areas and there are no signs of Urban Agglomerations.

DHOLPUR



Source: Administrative Map**,** Hydro-geological Atlas of Dholpur, 2017

Dholpur district comprises of 3033 sq km geographical area having 54.30 sq km hilly area and 2486 sq.km. mappable area. It is located in the easternmost side of the state of Rajasthan and is situated within 26°21'19" and 26°57'33" North latitudes and 77°13'06" and 78°16'45" East longitudes. It is bounded by Bharatpur district in the northwest, Sawai Madhopur and Karauli districts in southwest and rest of the boundaries are bordered by Agra district of Uttar Pradesh and Bhind & Morena districts of Madhya Pradesh. The District has six Subdivisions and six tehsils Dholpur, Bari, Baseri, Rajakhera, and Saipau & Sarmathura. The district is well connected by roads and railways. The Broad-gauge lines of Mumbai – Agra of Central Railways, passes through the district headquarter

The district comprises of alluvial plains and ravines in the eastern part and small flat topped hills in the western part. These hills are spread over 378.33 sq km area attaining altimetric variation of about 174 m from plains. The district is also known for ravines covering about

272 sq km area developed mainly on the banks of Chambal river. The highest peak (the Gurjar Pahar) in the district is about 357 m above mean sea level (amsl) and is located in the southwest of the district. The eastern plain lies at altitude between 163 and 171 m amsl. The central part of the district lies between altitude of 232 and 177 m amsl.

Geomorphologically, the district can be divided into following four main morphological units which is Western hilly areas, Central undulating plains, the eastern plain (east of Dholpur - Maina) alignment and about 3 to 10 km wide strip of plateau about the southern boundary demarcated by Chambal River. Ravines are very common and prominent physiographic features in the district.

Drainage: Dholpur district is covered in part by three river basins namely Parbati, Chambal and Gambhiri.

The river Parbati flows from west to east and is located in the central part of the district whereas river Chambal and river Gambhiri flow in the southern and northern extremities of the district respectively.

Both these rivers flow in the southwest -northeast direction. Drainage system of the district is quite well developed and is represented by Chambal, Gambhir and Parbati rivers and their various tributaries. The entire district falls under the Yamuna basin as both Chambal and Gambhir rivers are the tributaries of Yamuna River.

Major part of the district comes under Gambhir and Parbati sub basins and a narrow strip of the plateau part of the district running in NE-SW direction falls under Chambal sub basin.

Soil Types: Soils of the district have been classified into the following six categories:

• Sandy soil: It is restricted within a small NE-SW trending lenticular patch in the western part of the district.

• Loamy sandy soil: This type of soil occurs in a very small patch of the area in the western vicinity of Bari town.

• Sandy loamy soil: It occurs in two small patches, one located to the west of the district adjoining the sandy soil patch and the other around Turripura village in the western part of the district.

• Clayey soil: This variety of soil occurs in the eastern part of the district about 5 km southwest of Rajakhera and in the north-western part about 5 km north of Turripura village.

• Sandy clayey loam soil: This type of soil occurs in four isolated patches, two in north-western part and two in the central part of the district.

• Sandy clayey soil: This type of soil is the most prevalent in the district.

Out of total reporting area of 300913 ha, 27173 ha (9%) is covered by forests. Fallow lands cover 5.25% of the total area occupying 15795 ha and other uncultivated land occupy 26728 ha area covering 8.9% of the total area. About 74744 ha (24.84%) land is not available for cultivation.

Climate: Climate of the district can broadly be classified as semi-arid type. The hottest months are May and June, when the day temperatures soar to a maximum of 49-50□C.

Temperatures in summers are normally higher than 40□C. Winters are also very cold especially in the months of December and January where temperatures sometimes reach near 0□C or below the sub-zero level. The lowest recorded temperature is -4.3□C on January 29th, 1990. Monsoon season is marked by high humidity in the months of July to September and the area receives relatively low rainfall as the mean annual rainfall of the district is 669.9mm. The months of September and October are pleasant and mark transition to winters.

Demography:

According to the Census 2011, Dholpur had population of 1,206,516 of which male and female were 653,647 and 552,869 respectively and density is 398. There was change of 22.71 percent in the population compared to population as per 2001. The Literacy rate is 69.08% and Sex Ratio is 846.The Literacy rate is 69.08% and the city of Dholpur is considered as an urban agglomeration. 79.49% population resides in rural areas.

Economy:

Agriculture is the main pillar of economy in Dholpur. The district primarily comprises of agriculture based industries and activities. This may be attributed to the fertile land of district. Among existing micro and small scale industries, the number of agro based units is 291, higher than units of any other category. The district also contributes high in animal husbandry with a large cattle population here.

The district is rich in minerals and mineral wealth the district is constituted by sand stone & limestone. The significant portion of Dholpur and Rajakhera sub division area covered by the alluvium of the Chambal valley. Vidhyanchal occurs in the range which runs from Fatehpur sikari towards Hindaun, in which the sand stone deposits area are in plenty. The red sandstone of Dholpur is considered to be of good quality and is widely used in building constructions, thus having cluster of stone cutting and carving in Bari. The district has many medium and small scale industries.

RELEVANCE OF THE TOPIC

In recent decades, majority of the attention in criminality and crime control is focussed upon the nature of crime rather than focussing on the root causes that may lead an individual to commit crime. Geography can help create a link between the cause and effect relationship of crime. There have been many schools of thought that have attempted to emulate this relationship which considered various spatio – temporal parameters to find out what makes a person gravitate towards this choice. Even many penal philosophies have appreciated this fundamental connection between the geographic location and the impact on human psyche. Therefore, it is essential that more and more studies should be carried out in this arena and the possibilities are immense. The study area is one of the best examples that portrays the influence of geographical factors on crime and delinquency and which leads to individuals opting for the same.

The study would aim to form a strong link between the two then definitely it will prove beneficial for the common citizens' interest as well as in better upkeep of law and order.

Also, Rajasthan is a developing state and the Tehsils of Karauli and Dholpur have mentions in the ancient texts like Mahabharata and other puranas. This means that this area has been inhabited from a very long time, but still it is considered backward and unsafe because of the crime rate which acts as a deterrent in the development of the area. Thus, by following bottoms up approach and tackling the issue at the ground level can help in fostering better opportunities for the area as well as the state.

All these factors led me to select this topic. And this research can help in formulation of suggestions that aid better policing and even improve the general condition of the area and simultaneously lead to gradual development of the study area.

REVIEW OF LITERATURE

The review covers books, research articles, reports and Thesis on the research topic. The sources referred were from various sources belonging to international, national and relevant to the study area.

The major themes covered in the review are: Crime and Criminology, Factors affecting Crime, Geography and Crime, Vulnerability Rate and Crime Mapping.

CRIME AND CRIMINOLOGY

The **Monthly Crime Reports (2019)** by State Crime Records Bureau give a detailed account of the crime that were documented in the state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. Crimes increased by 19.76% and road accidents increased. Murders decreased and dacoity and kidnapping increased. Cyber crimes also were on the higher side.

The **Monthly Crime Reports (2018)** by State crime records bureau showcase a detailed account of the crimes that were documented in the state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. It is published every month and we have compiled all twelve of them. The crimes increased by 1.13% and murder, robbery and rapes increased and overall fluctuations were seen. Rajasthan ranked second in environmental related offences.

In his article **Yadav (2018)** elucidates the major types of crime and their causes in Rajasthan and examines the issues and trends of crime and aims to suggest preventive measures toward crime control in the State. He follows a quantitative approach to analyse and comprehend to compute the results. The paper concludes that the population density is linked directly with crime occurrences and suggests that the desert districts were safer as compared to the other parts during the study year.

Crime in Rajasthan (2017) which is the annual report gives a detailed account of the crimes that were documented in the state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. The crime decreased by 2.23% and crime rate was 248. Murders, rapes, dacoity and dowry deaths decreased but robberies increased marginally. Alwar, Bharatpur and Udaipur were major contributors.

In the chapter written by **Vij (2017)** sheds light on how the police and governance machinery react to the policing/security and civic order related needs of a megapolis existing in a democratic environment in order to see what more needs to be done at the policy level using

an exploratory research methodology. The paper analyses the spatiotemporal patterns of crime in Delhi with a focus on heterogeneity and concentration of multiple deprivations. Also author has portrayed the policing pattern over time and the important factors which affect this change.

The State Crime Records Bureau publishes the report titled **"Crime in Rajasthan" (2016)** which shows a detailed account of the crimes that were documented in the state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. It was observed that during year the crime decreased by 4.21% and the crime rate was 263. Murders, Robberies & Dacoity decreased whereas rapes increased marginally. Student suicides increased with a maximum over the past two years. Alwar, Bharatpur and Ajmer were the major contributors.

Agnew (2015) in his book "Why Do Criminals Offend: A General Theory of Crime and Delinquency" ventures to find out the reason for the question as what causes an individual to commit criminal offences and the solutions to tackle those factors. He developed his "Strain Theory" on the same guidelines. The book answers the question regarding why some individuals are more likely than others to engage in crime, this book synthesizes the best of current crime theory and research into a unified whole with a clarity that will enable students, the general public, and policymakers to understand and respond appropriately to crime and those who commit it.

Similarly the annual report by State Crime Records Bureau titled **"Crime in Rajasthan" (2015)** gives a detailed account of the crimes that were documented in the state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. From the detailed analysis it was observed that crime data it is clear that the Eastern Rajasthan recorded maximum crime and Alwar, Bharatpur and Jaipur are the most developed areas and registered maximum crime variation, whereas the desert area of Rajasthan, i.e. Jaisalmer far less.

Bruinsma et al. (2014) in the Encyclopedia is a comprehensive reference tool for the field of Criminology and Criminal Justice which aims to create a base for the study of Criminology and Criminal Justice. It is an essential and dynamic reference for researchers in the fields of Criminology and Criminal Justice, as well as useful a research tool for those in related fields of the social and behavioural sciences that gives a detailed understanding of the field and will be referred as various stages of the thesis.

Another year the annual report **"Crime in Rajasthan" (2014)** by State Crime Records Bureau aim of the study gives a detailed account of the crimes that were documented in the

state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. Minimum increase was recorded this year of 0.07% over previous year and the crime rate was 307. This year the murders increased along with robberies but dowry deaths decreased. Alwar, Bharatpur and Udaipur were the highest contributors.

Annual report by State Crime Records Bureau titled **"Crime in Rajasthan" (2013)** gives a detailed account of the crimes that were documented in the state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. With a detailed analysis it was found out that crime rate was 286 and the crimes increased by 10.65%. Maximum increase of 90.32% was seen in dacoity. The highest crimes were of violent nature followed by murder, rape and robbery. Jaipur, Alwar and Bharatpur and nearby districts had the maximum crime rate.

Banerjee et al. (2012) in their working paper explore the various incentives that can aid the police performance and thereby tackling the criminal situation in the state. Experimental Research where two unique large-scale randomized trials conducted in collaboration with the state police of Rajasthan, India sought to increase police efficiency and improve interactions with the public. Linking good performance with the promise of a transfer from the reserve barracks to a desirable police station posting, these incentives worked within existing organizational constraints and had very large effects on performance

Another annual report by State Crime Records Bureau titled **"Crime in Rajasthan" (2012)** in their descriptive research study which gives a detailed account of the crimes that were documented in the state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. A total crime increased by 7.99% over previous year and crime rate was 249. Dacoity and Rapes, Dowry deaths and robbery increased whereas murder reported no change. Alwar, Bharatpur and Udaipur were the highest contributors.

In the annual report by State Crime Records Bureau titled **"Crime in Rajasthan" (2011)** gives a detailed account of the crimes that were documented in the state over the year and also seeks make the information available to public about the upkeeps of the Home Department of the State. The detailed report crime rate increased by 5.56% over the previous year and the crime rate was 241. Murder and rape cases increased whereas dacoity decreased. Only 146 cyber cases were reported. Alwar and Bharatpur recorded the highest IPC crimes.

Breetzke et al. (2008) in their paper aim to investigate the applicability Ecological Theory of Crime in South Africa. The results from empirical research show that the American

Ecological Theory of Crime is applicable in the crime prone country of South Africa, but also the subjective nature of crime is discussed.

An article published in the Journal of Human Resources, the paper titled "The Dynamics of Criminal Behaviour: Evidence from Weather Shocks" written **by Jacob et al. (2007)** studies the dynamic nature of criminal behaviour and assess the impact of weather shocks on the same. The analytical research findings suggest that the long-run impact of temporary crime-prevention efforts may be smaller than the short-run effects and variation in criminal behaviour is linked to the weather transition.

In his quintessential book "Criminology" for anyone who wants to study crime, especially with reference to India **Ahuja (2000)** creates a solid base for the study of crime and various facets of it prevalent in India. He cites various theories and works that delve into the facets of human psyche and tries to find out the factors that affect crime. It presents the most recent data available on crimes and criminals and offers theoretical explanations also and criminological studies crucial facts which help us understand the human behaviour in general. He mentions the works of many famous scholars like Montesquieu, Quetelet, Dexter, Champneuf, Kropotkin, etc who supported the basis of geographical influence on crime. Various factors like Climate, Temperature, Humidity, etc have been used to show their influence on criminogical occurrences.

Brantingham et al. (1995) in their paper titled "Criminality of place-Crime generators and crime attractors" elucidate the concepts and methods that can help identify and comprehend the major crime hot spots, which eventually prove to be crime generators and by studying the major factors that can act as crime generators and situations that attract the crime in an urban system. One can definitely understand the influence of geographical conditions upon the same. It was also specified that some crime neutral areas tend to experience crimes rarely but even in those rare occurrences are by local insiders. Their study concluded that there are ways in which we assemble large building blocks of routine activity into the urban backcloth and this definitely can have enormous impact on our fear levels and on the quantities, types and timing of the crimes we suffer and by the acknowledgment of these factors can prove an effective tool in planning.

FACTORS AFFECTING CRIME

In the working paper **Gupta et al. (2017)** embark with the purpose is to investigate the relationship between various economic, demographic and deterrent factors and the crime rate in India. It is a Quantitative Research. The study covers the data of all the Indian states and

Major union territories of 2011. The findings show that factors like population density, sex ratio, minority population, poverty, per capita income, no of police personnel and literacy rate are crucial determinants of the rate of the criminal cases registered in India

Jha (2015) in his study aims to give a statistical and spatial analysis of the state level data on rape compiled by NCRB with the objective to examine spatial pattern of crime against women as well as rape crime in India and determine the various level of vulnerability exists in India and to correlate rape crime rate to some of the indicators of status of women Derivative Research where to determine the spatial pattern and different level of vulnerability Standard Deviation (SD) technique has been used The results show the level of vulnerability according to spatial variation. The paper gives a proof that the relation between rate of rape and socio-economic indicators of society along with the geographical elements involved in crime

Sreetheran et al. (2014) in the paper mentions that the main aim was to systematically review all those attributes that instil fear of crime in urban green spaces and to highlight their complex interaction by adopting a social-ecological framework. This descriptive research gave results that propose a socio-ecological framework that highlights the attributes which evoke fear of crime in urban green spaces and its interactions and can help guide future research.

The paper by **Gamble et al. (2012)** aims to investigate relationships between ambient temperatures and violent crimes to determine whether those relationships are consistent across different crime categories The analysis of relationship between daily fluctuations in ambient temperature, other meteorological and temporal variables, and rates of daily violent crime using time series piece-wise regression and plots of daily data was done. It was found that daily mean ambient temperature is related in a curvilinear fashion to daily rates of violent crime with a positive and increasing relationship between temperature and aggravated crime that moderates beyond temperatures of 80°F and then turns negative beyond 90°F.

Ceccato et al. (2011) in the article work with the objective to assess the levels and spatial patterns of crime in rural Sweden along with Map Creation to depict the crime. This quantitative research integrated GIS Mapping to show the relationship between various geographic factors that can cause crime in rural Sweden and the data is represented using GIS technique. Findings show that rural areas have become more criminogenic than they were a decade ago. Changes in the rates and geography were found using cluster techniques for both violence and theft. Although models of rural crime do not show any special 'rural dimension', the predicting variables in models containing both urban and rural areas are not

exactly the same as in models with rural areas only. Crime is often linked to the presence of alcohol-selling premises, characteristics of family structure and proportion of young male population.

The thesis by **Abu-Lughod (2006)** studies the physical characteristics of cities as well as analyzes the social and economic variables that can aid in the reduction of crime. This descriptive research gave findings in this study conclude that the physical variables make a significant contribution to the variation in the overall crime rate. Additionally, these results suggest that policing strategies and improvements in physical plans, urban design settings, and architecture can be successfully modified to reduce crime.

In their famous book "The City" **Park et al. (1968)** authors aim to develop a model that described the growth of a city and the scenario that follows subsequently. The authors elaborated a theory of urban ecology which proposed that cities were environments like those found in nature, governed by many of the same forces of Darwinian evolution that affected natural ecosystems and linked that criminal behaviour increases as the struggle for resources increases. Concentric zone theory was one of the earliest models developed to explain the spatial organization of urban areas. As sociologists, Park and Burgess, along with their students, used concentric zone theory extensively to explain the existence of social problems such as unemployment and crime in certain districts of Chicago. Their research program also involved the extensive use of mapping to reveal the spatial distribution of social problems and to permit comparison between areas. Burgess was particularly interested in maps and used them extensively, requiring that students in all of his seminars acquire proficiency in basic map-making techniques. This map was used subsequently as the base for dozens of thematic maps on the social characteristics of Chicago. Because the researchers were working within the Park and Burgess' urban ecology framework, they were most interested in identifying zones or natural areas. This work has been accredited as the major component in the Ecological Approach in Criminology.

GEOGRAPHY OF CRIME

Bawaria et al. (2019) in the research study discuss about the various responsible factors for the crime and its pattern for all the districts of Madhya Pradesh using a Spatio- Temporal Analysis. The paper concluded that Socio economic factors along with the locational elements impact the crime of the study area which has the highest crime rate in the country.

In the article published in the National Crime Records Bureau Journal, **Mandal (2019)** finds the relation between crime rate and change in temperature during different season and

analyse the relationship from the perspective of different crimes in the study area of Bihar with a quantitative approach. This research suggests that temperature is an important determinant of the number of criminal offences recorded in any place. Temperature has a significant effect on the number of violent crimes as well as on the number of property crimes recorded.

Reza et al. (2018) study the social and geographical factors that affect the phenomenon of robbery in the port city of Bandar Abbas of Iran using Empirical Research and analysed it quantitatively. The results showed that those areas that experienced most burglary are leaning towards with an environment which is polluted and corrupted. Thereby more likely one leads towards stealing tendencies. Thus it lead towards the authors in accepting the influence of Social and Geographic Elements on the petty crimes like burglary or robbery.

Karmakar (2017) in his thesis examines the crime situation of South 24 Parganas to reveal the deep rooted causes of criminality, hidden in the socio-economic and spatial attributes of this district. The research concluded with the demarcation of the various causes that lead to criminal occurrences of crime in South 24 Parganas from a multi dimensional aspect and appropriate suggestions were given.

Burke et al. (2015) examines the changing climate scenario and its impact on multiple types of human conflict, including both interpersonal conflict, such as assault and murder, and intergroup conflict, including riots and civil war using a quantitative approach. The authors concluded that findings from the growing body of rigorous research in economics, as well as from political science and other disciplines that use modern econometric analytical approaches, indicate that adverse climatic events increase the risk of violence and conflict, at both the interpersonal level and the intergroup level, in societies around the world and throughout history.

Seema (2013) ventures to understand the status of women and analyse how status of women is related to 'crimes against women' along with the identification the different forms of crime against women according to space using a Household Survey which was statistically analysed. The author was able to identify the major crimes and the motives behind them in the study area. Various government initiatives by government were given and suggestions were made to tackle the issue.

Lammers et al. (2013) aim to find a link between data collected from the Dutch DNA database to study whether the geographical dispersion of the crime locations of serial offenders influences the probability of arrest. With a derivative research the results show that

the probability of arrest decreases with increasing geographical dispersion, measured as the number of police regions in which the offender's crimes have been committed

Murataya et al. (2013) in the research paper attempts to review archival and quantitative data from multiple research studies from various areas around the world that show the linkage between weather and crime occurrences. The review paper suggests that these studies show both negative and positive outcomes involving the correlation between weather and crime like in the case of Heat and intensity of Violence is greater as the other component increases.

Brunsdon et al. (2009) in their paper study the effect of weather and crime on each other by considering the effect of weather parameters on the spatial arrangement of crime. They focus on how this relationship occurs within an urban area of the UK. Quantitative Research The paper showcases various techniques that can be used to showcase the impact of weather on the local geographical patterns of crime reporting.

Waller et al. (2007) in the paper review and contrast spatially heterogeneous effects and provides an in-depth comparison of "geographically weighted regression" models after studying selected criminal offences using quantitative methodology. The results show how the geographic factors of a place play significant role in the occurrence of crime using regression along with locational variations are also discussed.

Pourahmad et al. (2003) evaluates the impact of the locational conditions of the city and crime areas on committing illegal behaviours and activities using analytical methodology. The results of the research show that there is a meaningful relation between crime perpetuating and characteristic of the location of crime such as darkness and solitude of the environment. Furthermore, the density of the population acts as an effective factor in committing crimes.

In the research thesis by **Datta (1994)** the cognizable crimes and their density in the district are identified and their effect on North 24 Parganas is analysed. She also finds out the various social and geographical elements that trigger those crimes using a descriptive study. The author concludes that the situation pertaining to crime in North 24 parganas is very much affected by the geographical situation and this causes an influence on the social conditions that trigger the crime.

Pain (1991) aims to find out various elements of crime included in crime against women by using feminist approach as well as geographical analysis. It is an empirical research. The paper suggests that when the social factors of crime against women were teamed up with geographical factors, gave very precise outcomes about the criminal events.

VULNERABILITY RATE

Kalantari et al. (2019) aim to examine the spatial distribution of five types of burglary in Zanjan city, NW Iran determine the precise area of urban crime hotspots, where the crime rate is significantly different from the surrounding area and thereby formulate a model on selected parameters. Derivative Research The authors conclude that this study can help to select the appropriate strategy to control and prevent crime occurrences in every crime density class as crime hotspots can be identified with appropriate accuracy.

Paul (2018) in his research paper tries to statistically analyse the criminal events in the study area and the various factors affecting them with a special reference to crime against women and prepare maps using GIS techniques. Quantitative Research and GIS Mapping The paper identifies various spaces on the basis of Vulnerability Index and has categorically divided the study area according to the forecasting of criminal activities.

The research paper by **Gokhale (2017)** aims to demarcate the various issues and crimes related to women from a geographical perspective. The author tries to identify the various techniques and measures that can be taken to make the cities safer and women friendly. Using analytical research, this paper shows various scenarios and conditions that led to criminal offences being committed against women and cites various scenarios and tools that have made the public places safer for women. Various GIS tools are discussed which can be implemented to build safer spaces by calculating vulnerability of any area.

In her research paper **Kannan (2017)** created detailed map work of the crime and identify clusters and hot spots of crime prone zones along with delineating the susceptible pockets of crime on the basis of concerned socio-economic parameters. It also conducts a spatial investigation of rape incidences in the Dargah region of Ajmer using geospatial techniques. Various Geospatial tool usages in crime analysis by means of primary data collected from all police stations of Ajmer city. Interaction with the major stakeholders of crimes to gather domain knowledge has been used in analysis inference. This study presents alarming results for the concerned administrative departments as it indicates some strong correlations between the socio-economic parameters and crime sprawl.

In her thesis **Priya (2017)** studies the conceptual development of the urban crimes in Kumbakonam for the past decade and find the highest urban crime zones and create a GIS database for police department as well as the citizens using a Descriptive research methodology. The research concluded in highlighting crime hotspot maps as efficient method of mapping high intensity of crime prone areas and the use of GIS/RS techniques in Spatio-

temporal analysis proved as an effective tool to comprehend the implicit correlation among events.

In her research paper by **Poonia (2015)** primarily focuses on the Crime in Rajasthan report, 2013, published by State Crime Records Bureau, Rajasthan used to present vulnerability of all districts of Rajasthan in terms of incidences of crime and public safety measures and to map the information in terms of vulnerability to crimes and availability of police services using a quantitative research. The author suggests a need for strategic shift in policing to reduce crime levels in the society along with the purpose to convey to citizens and tourists which districts are the safest and in which districts they have to be alert and attentive to avert any danger, for instance the eastern districts, Capital and surrounding districts are far more dangerous than the western and southern districts of the state.

In a chapter by **Corcoran et al. (2014)** the depiction of the applicability of GIS Mapping in United Kingdom as an integral component of crime detection so as to make the environment safer from community perspective was undertaken using an exploratory research methodology which calculated the vulnerability rate and an index was created. The study concluded by showing the applicability of HASCADE model, as a GIS Mapping tool integrated with real time information overlapped with the criminal data base and vulnerability index for forecasting and information of people.

Vanamore (2013) in his thesis with the major objective of this research is to study the spatial variations in the type of crimes in Maharashtra and to identify the crime prone regions of the state in order to give mitigation measures. This descriptive research study concludes with the identification of the crime hotspots and mapped them accordingly and gave effective mitigation measures to tackle the problems. All the study was predominantly was derived from secondary sources and then various statistical analyses were undertaken, which eventually was represented as vulnerability index and depicted cartographically.

CRIME MAPPING

In the research by **Cozens et al. (2015)** aim to review the current status of the concept of Crime Prevention through Environmental Design (CPTED) and to check its present day reliability and applicability in the changing nature of crime using Analytical Research methodology. The authors conclude that Crime is a complex phenomenon and the practitioners need to accept the complexity rather than assuming it does not exist. The CPTED model must continually adapt to changes such as increasing urbanization, population densities and population diversity, new technologies and products, new ways of life, and

emerging crime problems. RTM has similar contextual approach and both in an evolved manner can serve as a promising approach when it come to collaborating Geo-informatics with real time situation in order to tackle crime and crime forecasting.

The study done by **Dugato (2013)** is one of the first applications of Risk Terrain Modeling (RTM) in an urban context outside the US. It focuses on robberies recorded in Milan, Italy from 2007 to 2010 and applies RTM methodology to analyze urban risk factors in order to forecast future robbery location. Moreover, it discusses the effectiveness of RTM in comparison with another crime forecasting technique and its usefulness for orienting security policies, including countries characterized by poor crime data quality and availability

Risk terrain modeling is an effective tool that identifies the crime on the basis of various geographic factors and can help prevent future occurrences of crime and also help various agencies in creating safer scenarios in the city of Milan.

Following the same ideology **Caplan et al. (2011)** in their research article check the applicability of Risk Terrain Modeling in various scenarios like in Irvington, Atlantic City, various towns of New Jersey, Chicago, etc. Different types of crimes were used to analyse this under systematic approach with a collaborative applicability of Police Department of the local areas. This investigation gave very productive results and even reduced the crime by at least 24% in all spheres. This proves the efficiency of this methodology.

The major proponents of Risk Terrain Modeling, **Caplan et al. (2010)** in their book research present has two key objectives. The first is to apply risk terrain modeling (RTM) to forecast the crime of shootings. The risk terrain maps that were produced from RTM use a range of contextual information relevant to the opportunity structure of shootings to estimate risks of future shootings as they are distributed throughout a geography. The second objective was to test the predictive power of the risk terrain maps over two six□month time periods, and to compare them against the predictive ability of retrospective hot spot maps. It is a Descriptive research that uses GIS Digital Terrain Modelling. The results suggest that risk terrains provide a statistically significant forecast of future shootings across a range of cut points and are substantially more accurate than retrospective hot spot mapping. In addition, risk terrain maps produce information that can be operationalized by police administrators easily and efficiently, such as for directing police patrols to coalesced high□risk areas.

Thus, these sources of literature helped in widening the horizons and learning about the relevant material on respective topics.

OBJECTIVES:

The following are the Objectives of the study:

1. To identify and analyse the Geographical factors affecting the occurrence of crime in Karauli and Dholpur districts.
2. To calculate and map the Vulnerability Index of the Karauli and Dholpur districts.
3. To provide relevant suggestions to mitigate the ill-effects of these factors that lead to crime.

HYPOTHESES:

The Hypotheses of the study are as follows:

Null Hypothesis: There is no impact of Geographical Factors on the occurrence of crime in the study area.

Alternate Hypothesis: There is significant impact of Geographical Factors on the occurrence of crime in the study area.

RESEARCH METHODOLOGY

Source of Data Collection

The study is based on the amalgamation of primary and secondary data .For the same, secondary data and literature is collected from the research institutions, libraries and related government departments and primary data collection is undertaken by Field Survey which shall delve into the citizens' perception towards crime and the factors affecting them. This will be conducted in the districts of Karauli and Dholpur. The data shall be statistically analyzed and presented in the form of appropriate tables, maps and graphs.

Methods of Data Processing

The data will be analyzed in two modes, i.e. statistical analysis and cartographic analysis. The statistical analysis will be done with the help of SPSS (Statistical Product and Service Solutions) and E- Views. Bi- Variate and Multivariate analysis will be used for correlations.

Students't Test is the method that is considered for the Test of Significance. For cartographic work adequate software will be used. Risk Terrain Modeling is also considered for the same.

Case Studies

Two case studies will be conducted covering both rural as well as urban area. For this first will be conducted in the district of Karauli and another in the district of Dholpur. An appropriate schedule/ questionnaire will be prepared for the same and results will be computed accordingly. Data will be collected from Hindaun, Karauli, Mandrail, Nadauti, Sapotra and Todabhim Tehsils of Karauli districts as well as Dholpur, Bari, Baseri, Rajakhera, and Saipau & Sarmathura Tehsils of Dholpur district. The sample size will be 1000 per Tehsil. Along with this various stakeholders will be interviewed and perceptional survey will be undertaken.

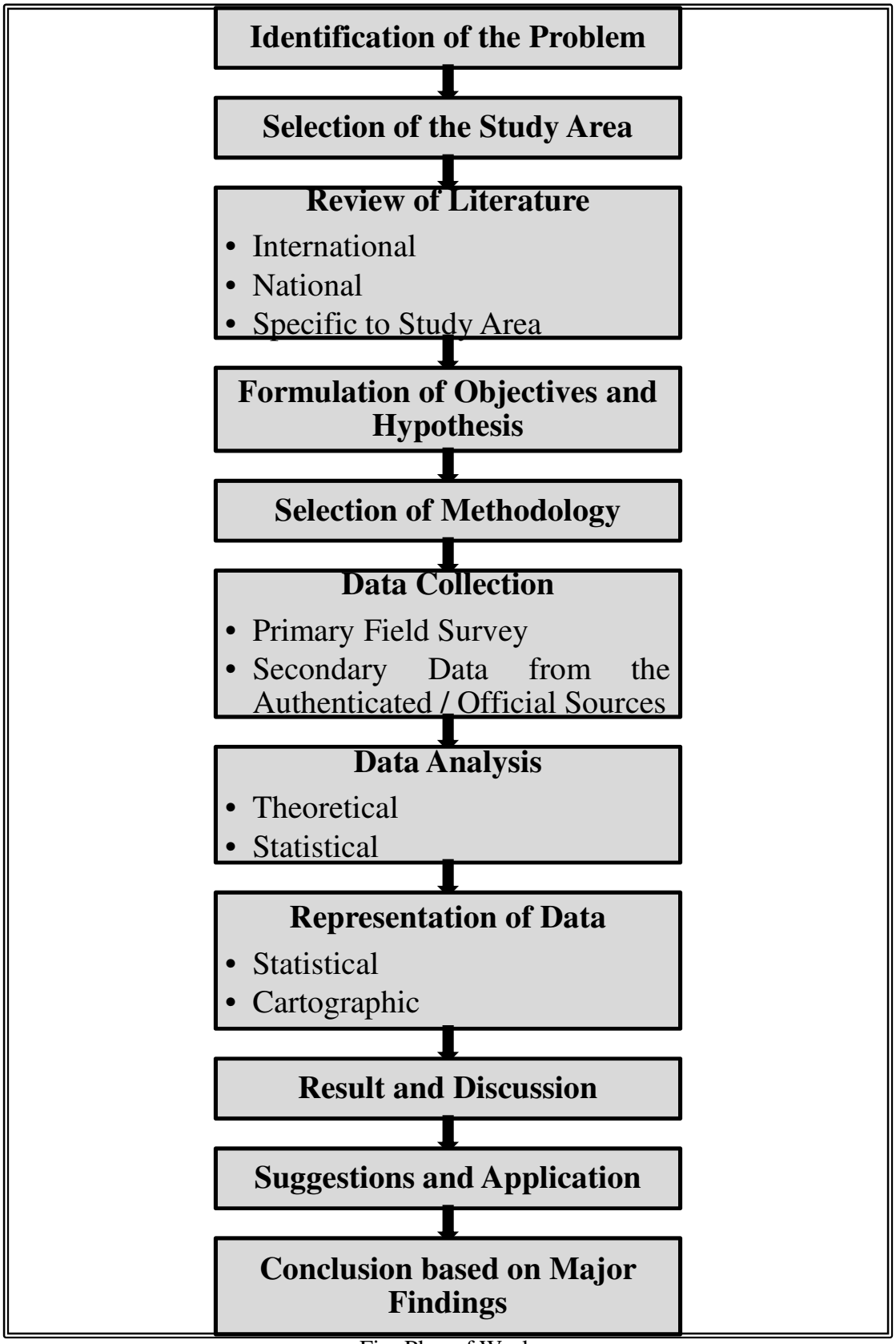


Fig: Plan of Work

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